FIG. 1 (PRIOR ART)

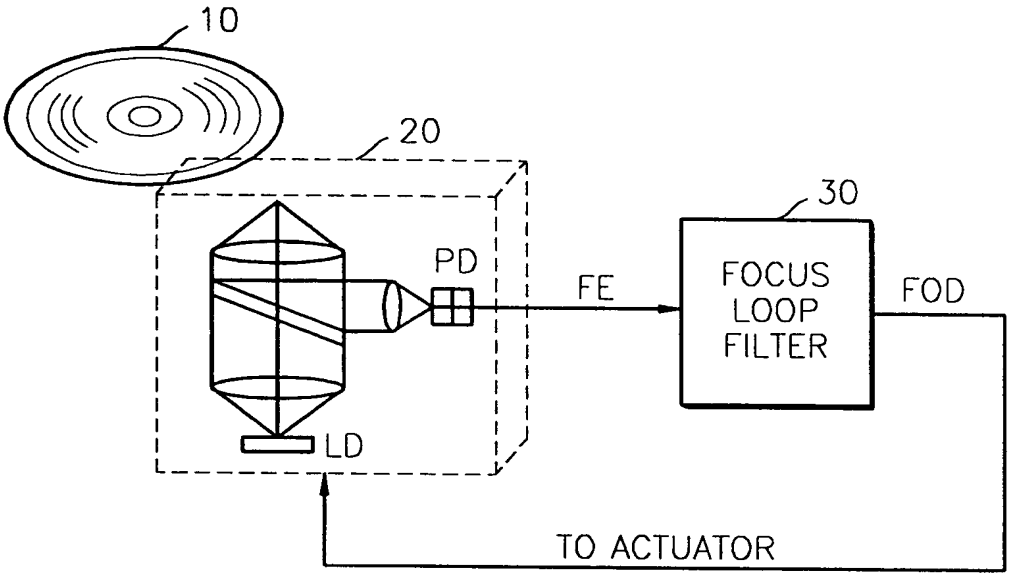

FIG. 2 (PRIOR ART)

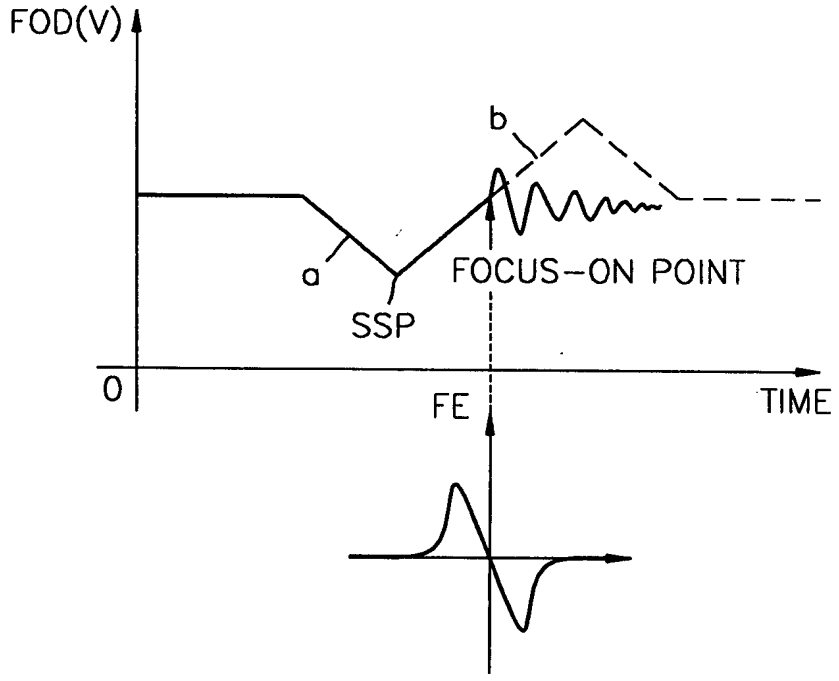

FIG. 3 (PRIOR ART)

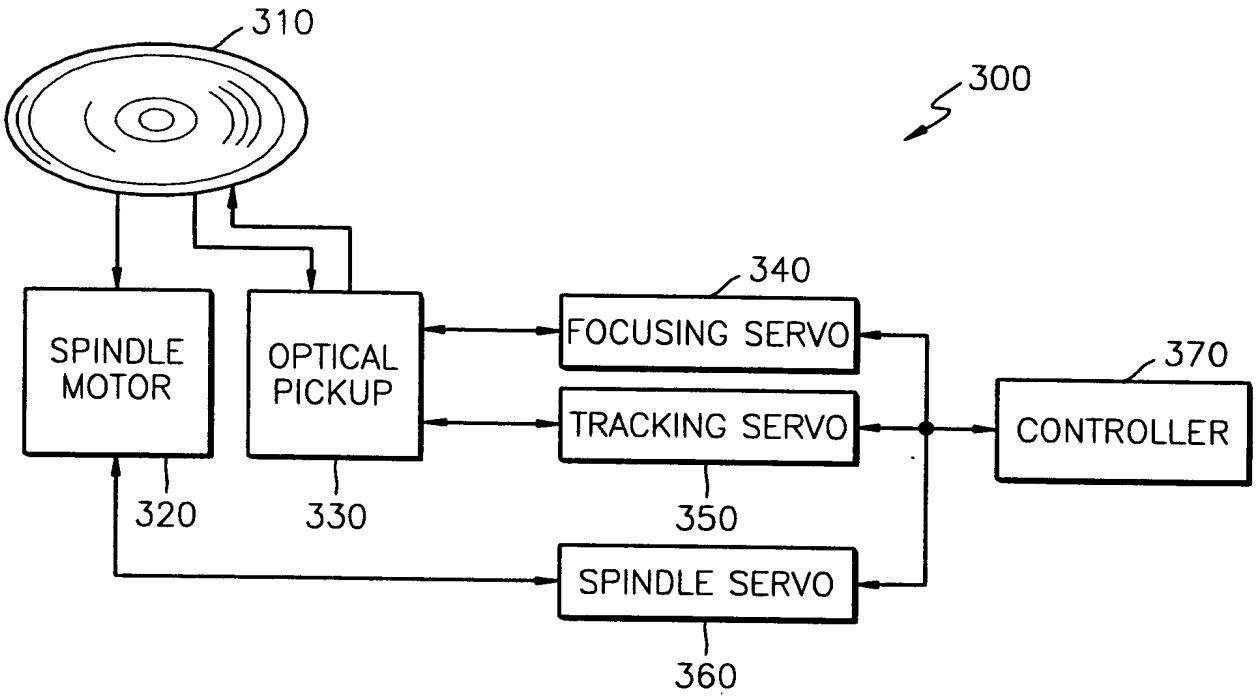

FIG. 4

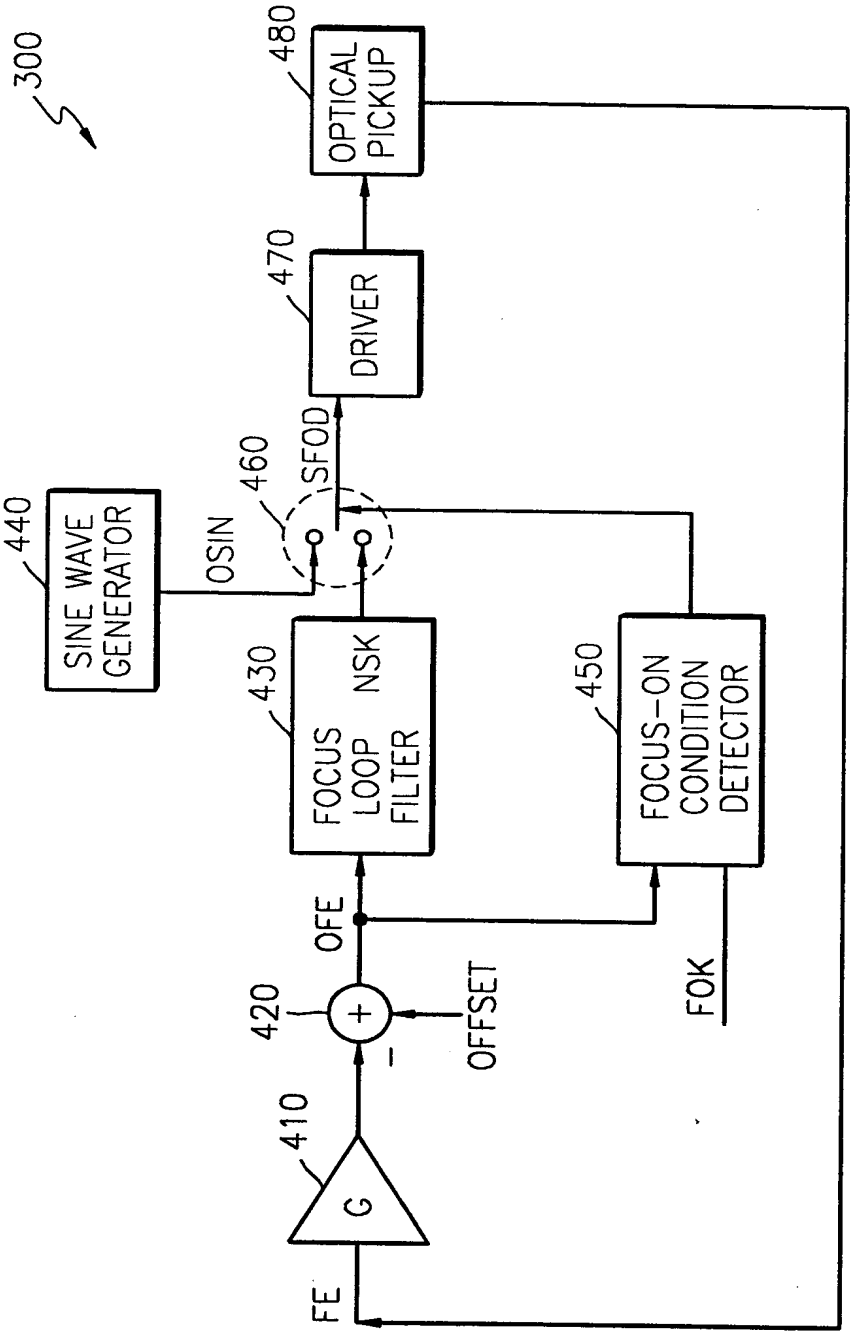
300
480
OPTICAL PICKUP
470
DRIVER
460
SFOD
440
SINE WAVE GENERATOR
OSIN
430
FOCUS LOOP FILTER
NSK
450
FOCUS-ON CONDITION DETECTOR
OFE
420
+
-
OFFSET
FOK
410
G
FE

FIG. 5

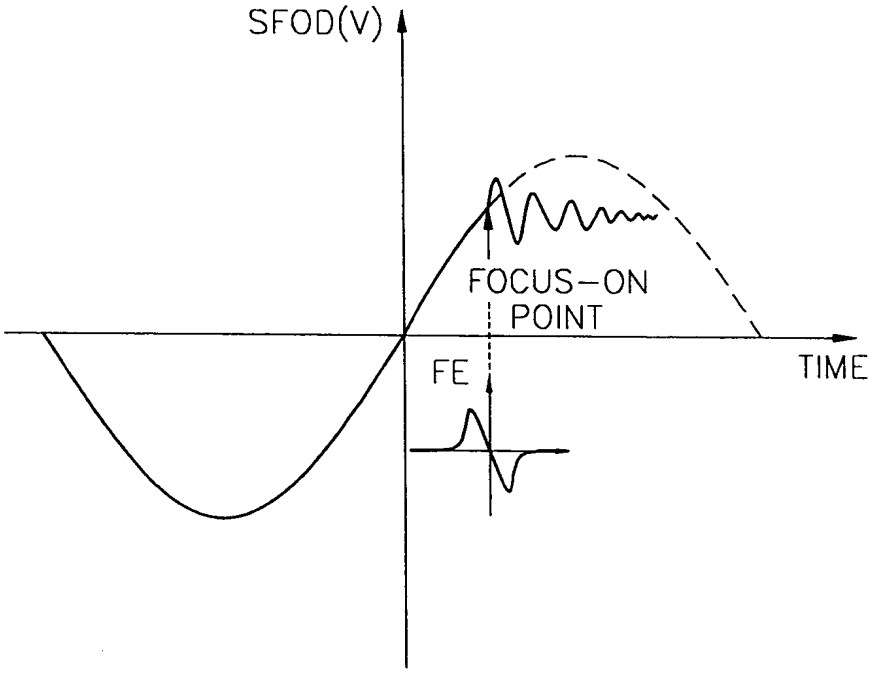
SFOD(V)
FOCUS-ON
POINT
TIME
FE

FIG. 6

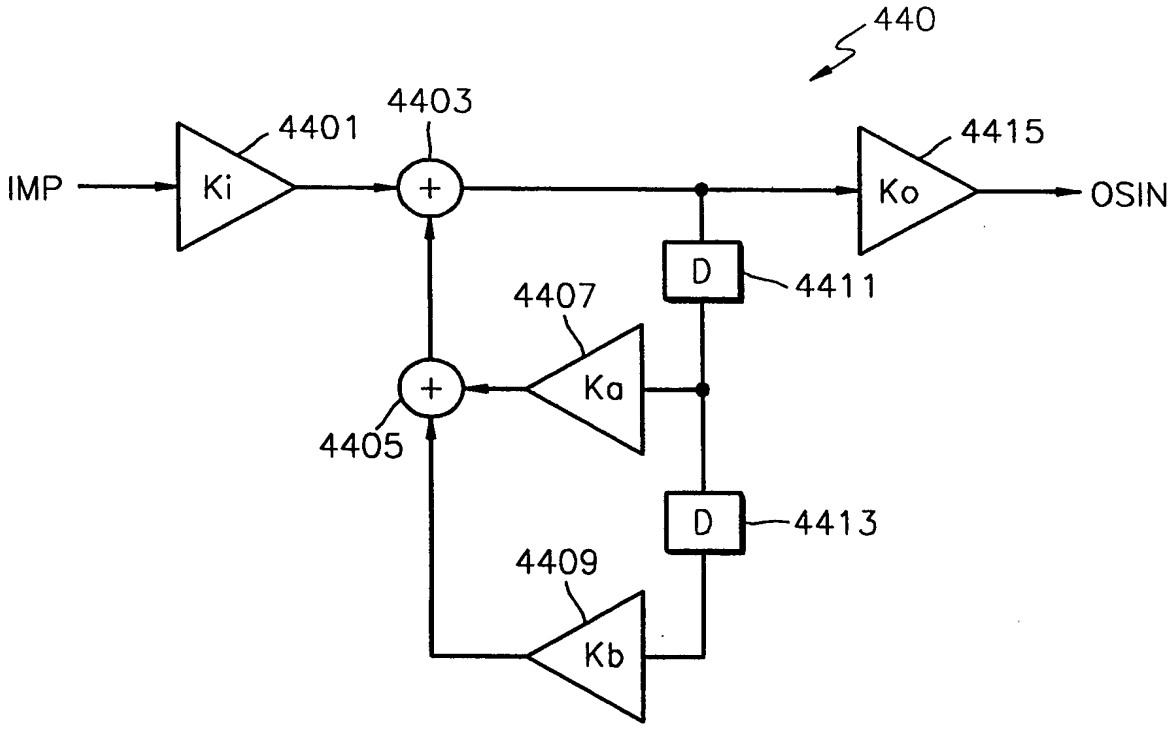
440
4401
4403
4415
IMP
Ki
+
Ko
OSIN
D
4411
4407
Ka
+
4405
D
4413
4409
Kb

FIG. 7

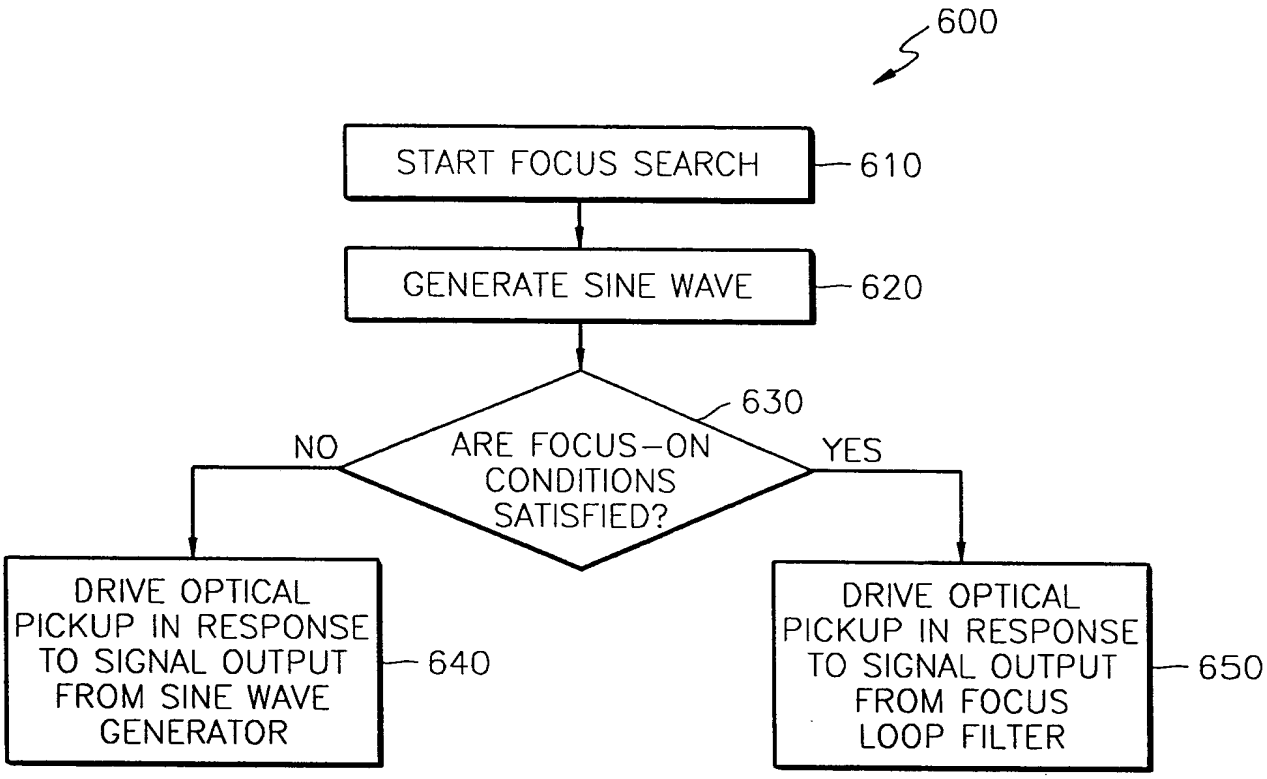
600
START FOCUS SEARCH
610
GENERATE SINE WAVE
620
630
ARE FOCUS-ON CONDITIONS SATISFIED?
NO
YES
DRIVE OPTICAL PICKUP IN RESPONSE TO SIGNAL OUTPUT FROM SINE WAVE GENERATOR
640
DRIVE OPTICAL PICKUP IN RESPONSE TO SIGNAL OUTPUT FROM FOCUS LOOP FILTER
650

FIG. 8

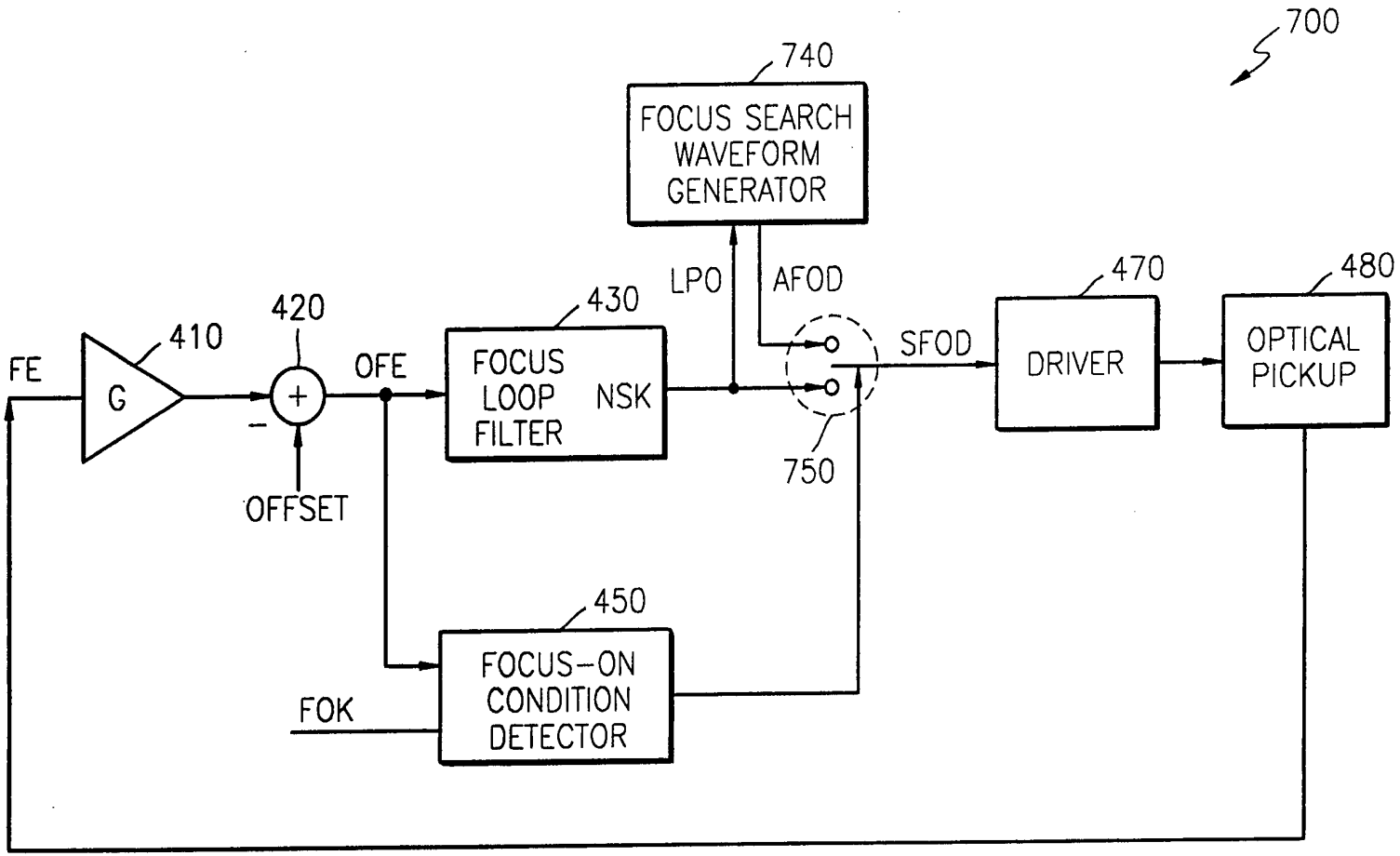
700
740
FOCUS SEARCH WAVEFORM GENERATOR
LPO
AFOD
470
480
420
430
410
SFOD
FE
G
OFE
FOCUS LOOP FILTER
NSK
DRIVER
OPTICAL PICKUP
750
OFFSET
450
FOCUS-ON CONDITION DETECTOR
FOK

FIG. 9

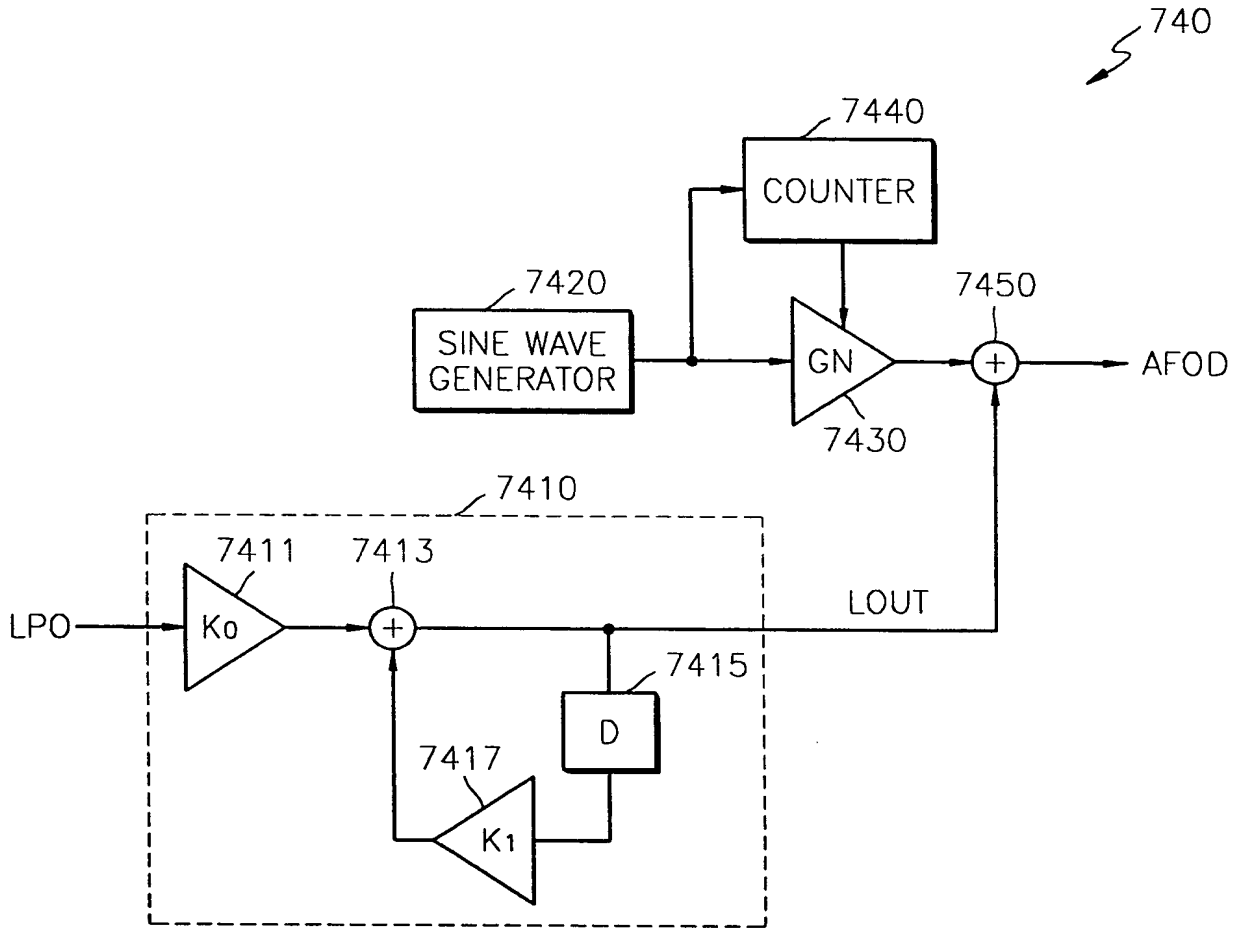
740
7440
COUNTER
7420
SINE WAVE GENERATOR
7450
GN
AFOD
7430
7410
7411
7413
LPO
Ko
LOUT
7415
D
7417
K1

FIG. 10

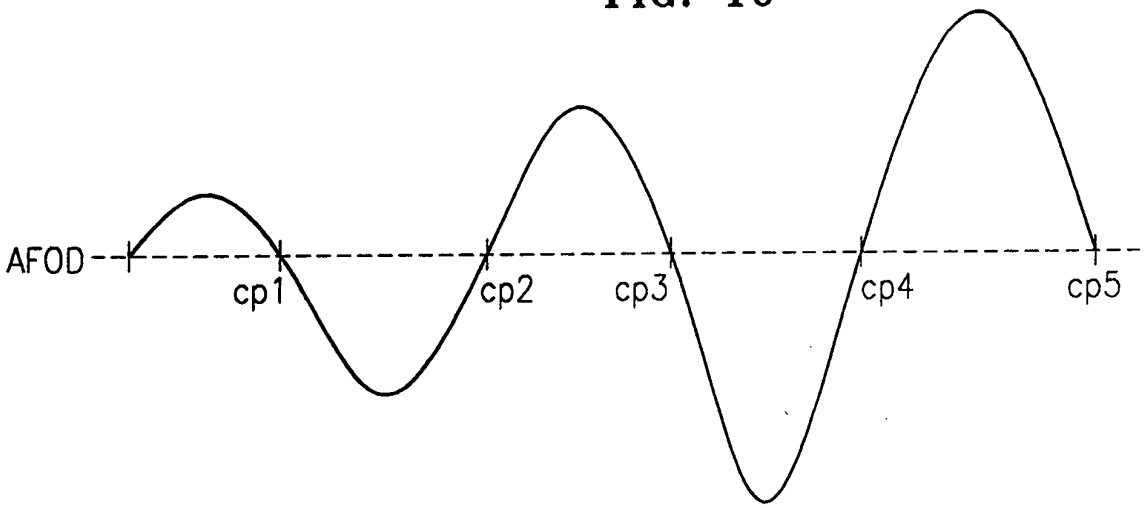

FIG. 11

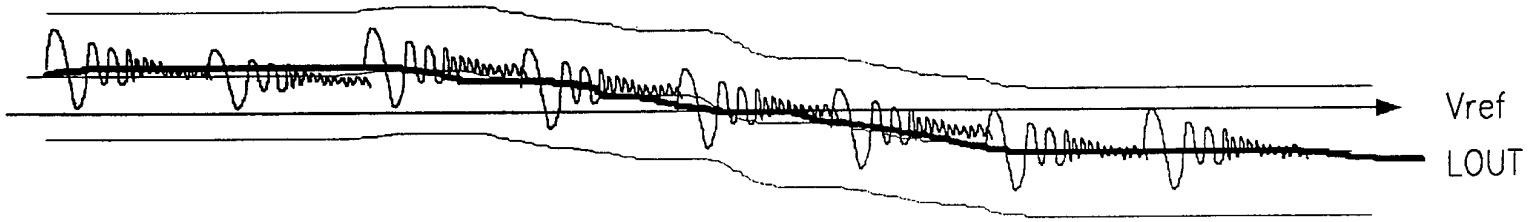

FIG. 12

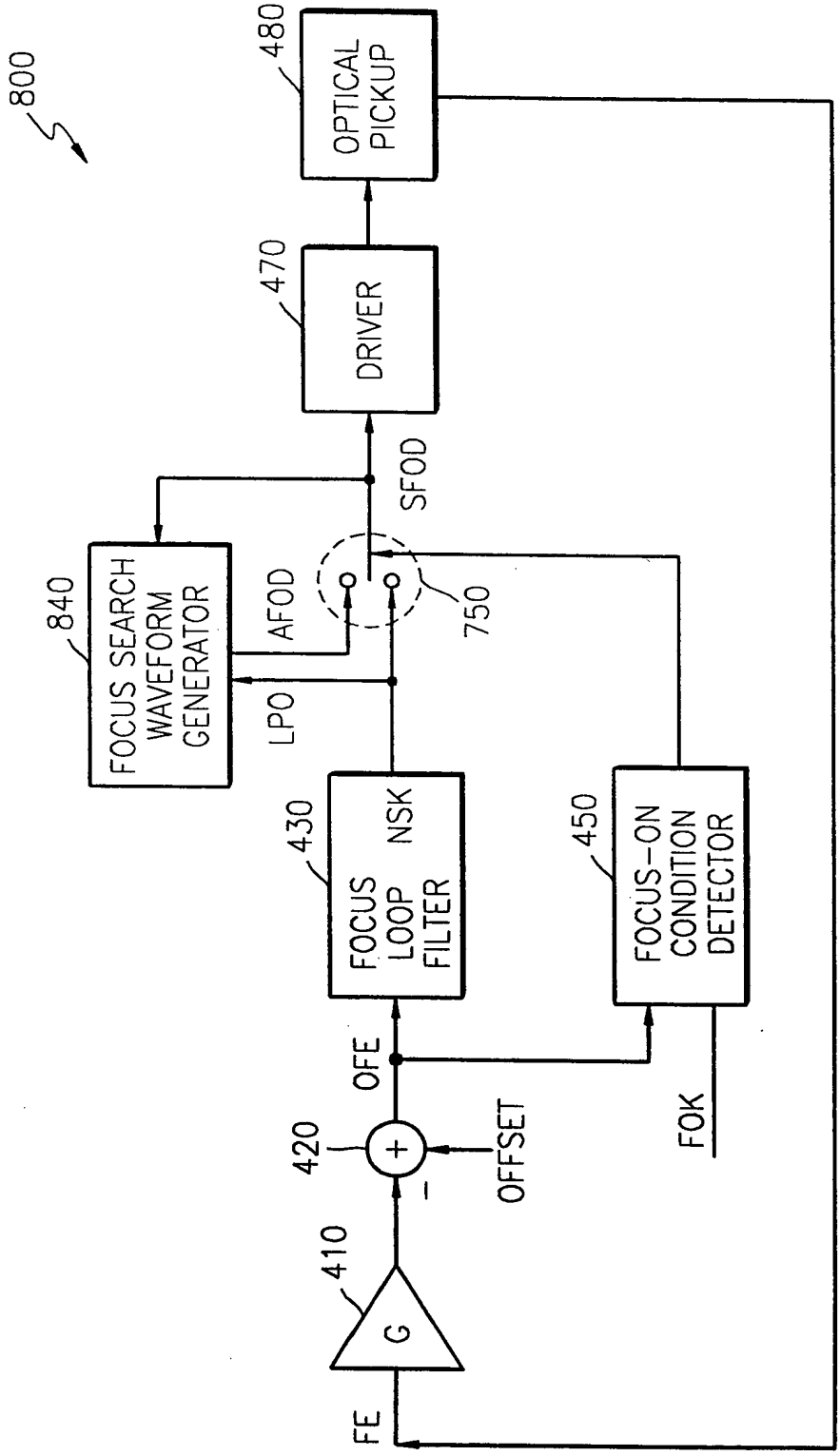
800
480
OPTICAL PICKUP
470
DRIVER
SFOD
840
FOCUS SEARCH WAVEFORM GENERATOR
AFOD
LPO
750
430
FOCUS LOOP FILTER
NSK
450
FOCUS-ON CONDITION DETECTOR
OFE
420
OFFSET
FOK
410
G
FE

FIG. 13

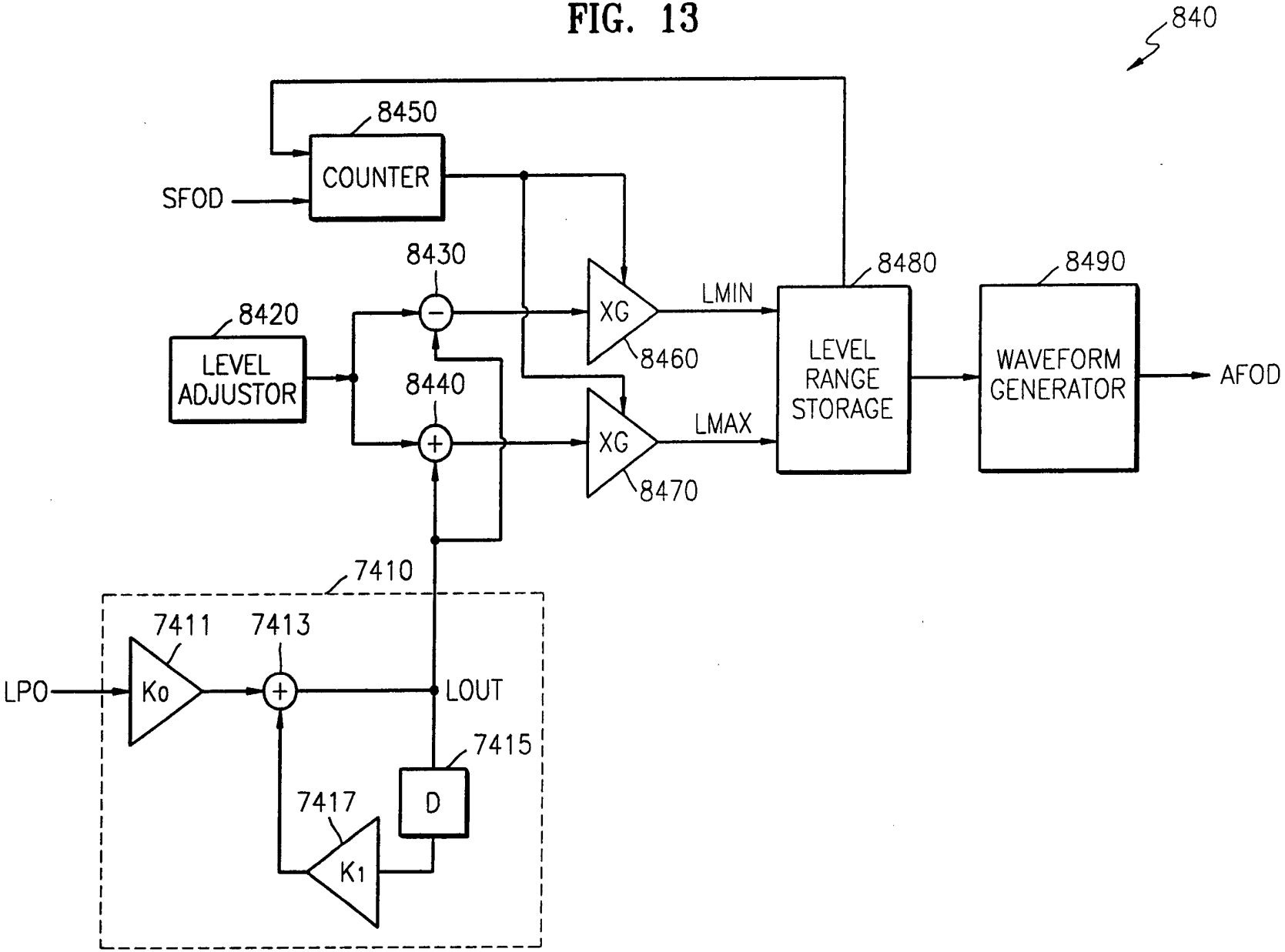
840
8450
COUNTER
SFOD
8430
8420
LEVEL ADJUSTOR
8440
XG
8460
LMIN
XG
8470
LMAX
8480
LEVEL RANGE STORAGE
8490
WAVEFORM GENERATOR
AFOD
7410
7411
7413
LPO
K0
LOUT
7415
D
7417
K1

FIG. 14

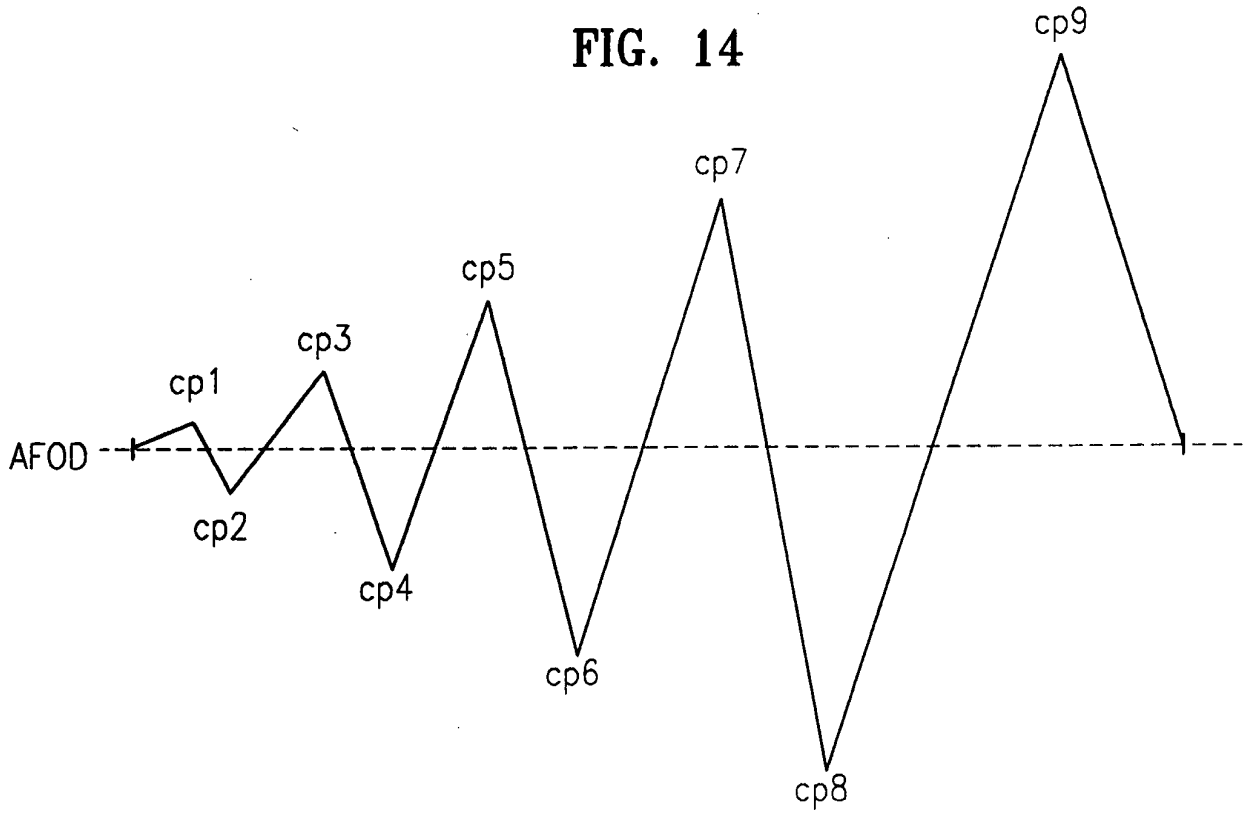
cp9
cp7
cp5
cp3
cp1
AFOD
cp2
cp4
cp6
cp8

FIG. 15

Vref
LOUT
RANGE OF FOCUS SEARCH=AFOD±SL

FIG. 16

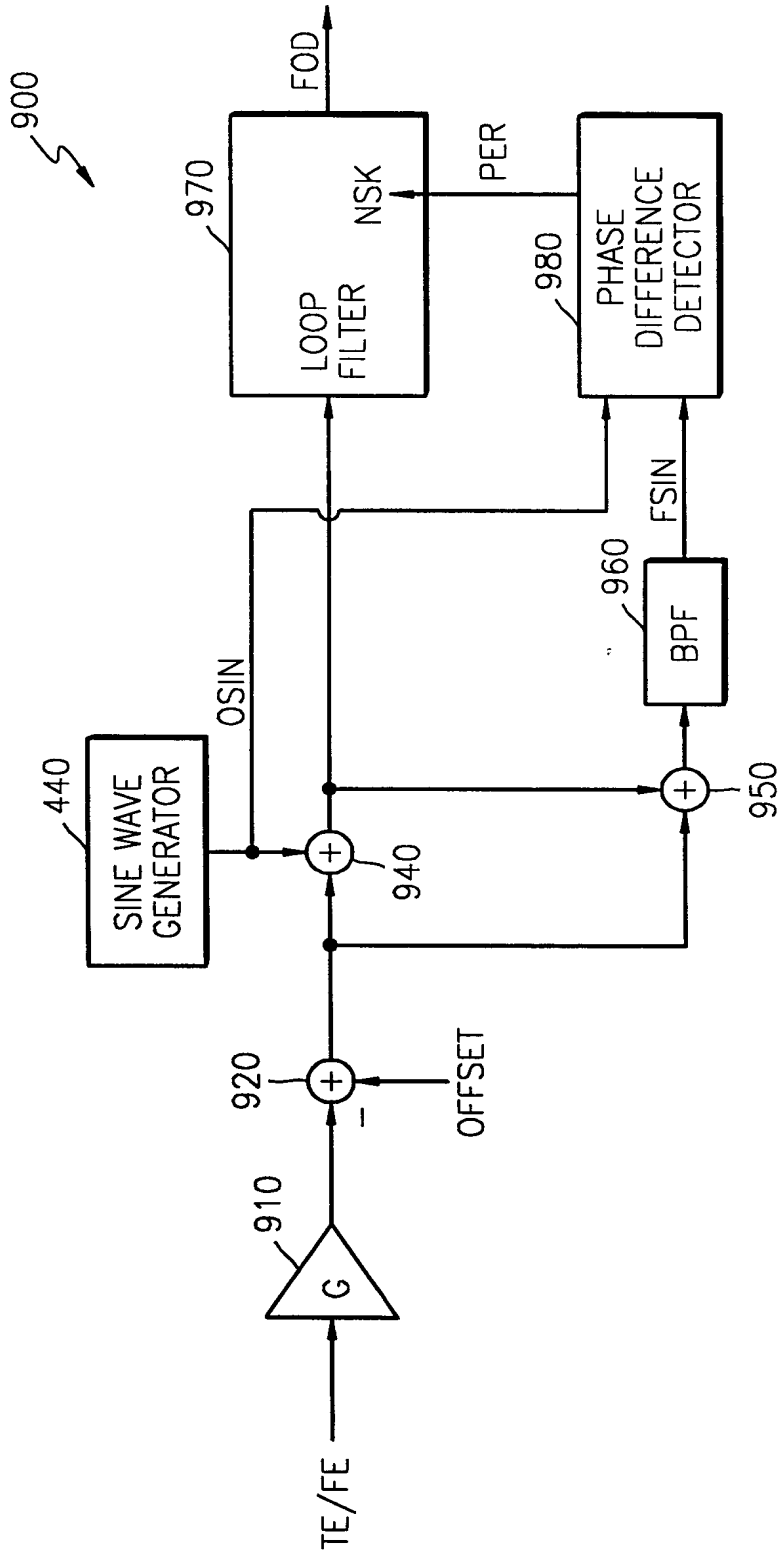
900
FOD
970
LOOP FILTER
NSK
PER
980
PHASE DIFFERENCE DETECTOR
960
BPF
FSIN
OSIN
440
SINE WAVE GENERATOR
940
950
920
OFFSET
910
G
TE/FE

FIG. 17

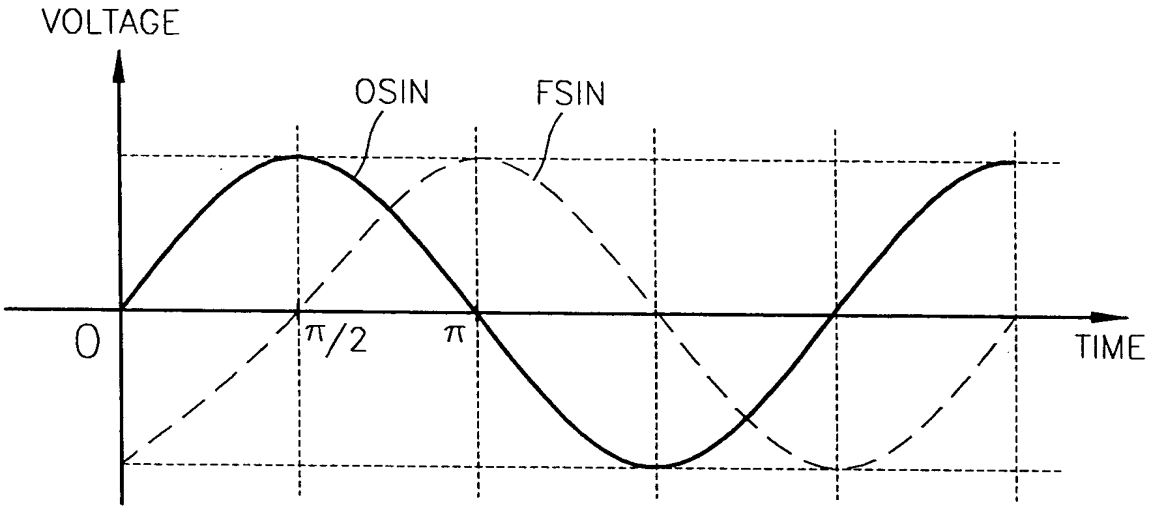

FIG. 18

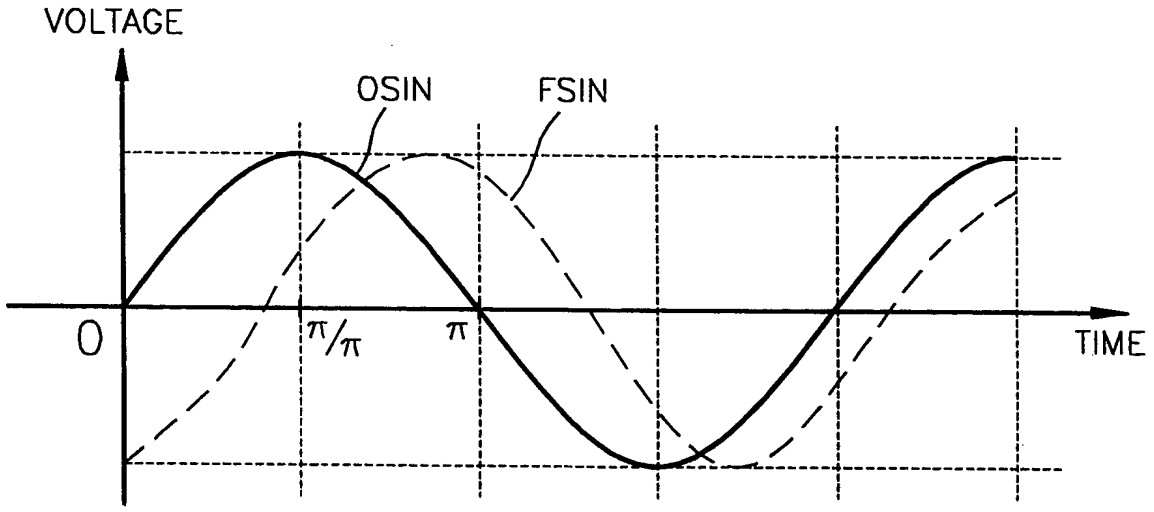
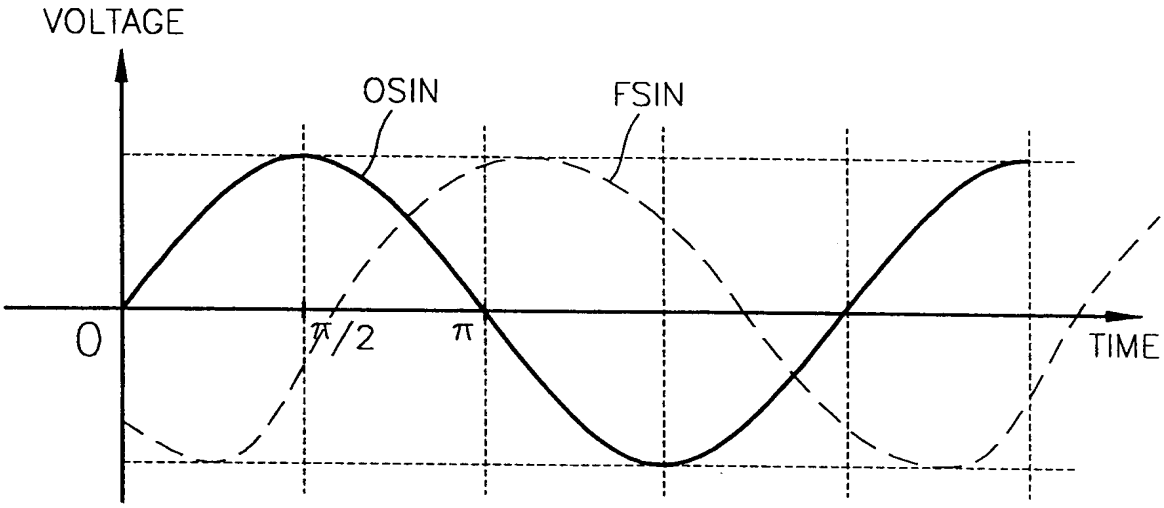
FIG. 19